ANALYTICAL RESULTS REPORT

RICO ARGENTINE
Rico, Dolores County, Colorado

CERCLIS ID No. COD980952519

EPA Contract No. 68-W5-0031
TDD No. 9511-0015

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SUBJECT: START, EPA Region VIII, Contract No. 68-W5-0031, TDD No. 9511-0015
Analytical Results Report - Rico Argentine, Rico, Dolores County, Colorado

Dear Robert:

Enclosed is a copy of the Final Analytical Results Report for the Rico Argentine site in Rico, Dolores County, Colorado. This document is submitted for your approval.

If you have any questions or comments, please call me at (303) 291-8270.

Very truly yours,

URS OPERATING SERVICES, INC.

Barry Hayhurst
Site Investigator

cc: T. F. Staible/UOS
File/UOS

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ANALYTICAL RESULTS REPORT for EXPANDED SITE INSPECTION

Rico-Argentine
Rico, Dolores County, Colorado

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1.0 INTRODUCTION

This Analytical Results Report (ARR) of the Rico-Argentine site in Rico, Dolores County, Colorado (CERCLIS ID # COD980952519), has been prepared to satisfy the requirements of Technical Direction Document (TDD) No. 9511-0015 issued to URS Operating Services, Inc. (UOS) on November 22, 1995, and amended by TDD No. 9511-0015A on January 25, 1996, by the Region VIII office of the U.S. Environmental Protection Agency (EPA). Field work at the Rico-Argentine site was conducted during the week of September 11 through 15, 1995, and followed the Expanded Site Inspection (ESI) format (U.S. Environmental Protection Agency (EPA) 1992).

Field activities were conducted by URS Consultants, Inc, (URS) and followed the applicable URS Technical Standard Operating Procedures (TSOPs). Field activities specifically included collecting 45 environmental samples comprised of 16 source samples, 11 surface water and 11 sediment samples, 6 residential soil samples, and 1 groundwater sample, plus 9 field Quality Assurance/Quality Control (QA/QC) samples (in addition to the laboratory matrix spike/matrix spike duplicate (MS/MSD) (Table 3). Non-sampling activities included gauging the flow of Silver Creek, Scotch Creek and the Dolores River, describing and delineating wetlands for approximately one mile along the Dolores River downstream of the confluence with Silver Creek, and measuring water quality parameters (pH, temperature and conductivity) at five non-sampling locations (Figure 2).

The samples were shipped through the contract laboratory program (CLP), routine analytical services (RAS). Samples that were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and pesticides/PCBs were sent to RECRA Environmental, Columbia, Maryland. Samples that were analyzed for cyanide and total or dissolved metals were sent to Southwest Labs of Oklahoma at Broken Arrow, Oklahoma. This ARR is intended to be used in conjunction with the Rico-Argentine Field Sampling Plan (FSP) (URS Consultants, Inc. (URS) 1995a) and the Rico-Argentine Sample Activities Report (URS 1995b) (Appendix A).

2.0 OBJECTIVES

The purpose of the ESI was to gather data pertinent to the evaluation of the Rico-Argentine site with regard to the EPA's Hazard Ranking System (HRS) criteria. The specific objectives of the ESI were to:

- Acquire and utilize non-sampling data (i.e., existing reports, analytical data or physical measurements) documenting past releases from the site source areas;
- Identify and delineate receptor targets for the surface water and groundwater pathways;
- Determine resident populations subject to contamination via the soil exposure pathway;
- Document potential release of site contaminants to users of groundwater from the alluvial aquifer; and
- Document potential releases of site contaminants to targets along the surface water pathway.

3.0 BACKGROUND INFORMATION

3.1 SITE LOCATION AND DESCRIPTION

The Rico-Argentine site is located in the Rico Mountains of southwestern Colorado and encompasses approximately 75 acres of settling ponds and tailings piles north and east of the town of Rico in Eastern Dolores County, Colorado (Figures 1 and 2). The legal description of the site is the southeast quarter of Section 25, T. 40 N, R. 11 W. The approximate site coordinates are 37° 42' 05" North latitude and 108° 01' 39" West longitude (U.S. Geological Survey (USGS) 1960). The Rico-Argentine site can be reached by proceeding south from Telluride, Colorado, on State Highway 145 over Lizard Head Pass to the town of Rico, or by proceeding north from Cortez, Colorado, on State Highway 145 to the town of Rico.

3.2 SITE DESCRIPTION

The Rico-Argentine site is an inactive mining and milling operation located in two drainages, the Dolores River and its tributary Silver Creek. Part of the site is within the northern and eastern city limits of Rico, Colorado. One part of the site extends northeastward up the Silver Creek drainage, and another part extends northward along the east bank of the Dolores River drainage (Figure 2). The Rico-Argentine Mill, Blain Tunnel and two large tailings piles are located adjacent to Silver Creek, approximately one mile east northeast of the town of Rico (Figure 2). The St. Louis Tunnel adit, an inactive sulfuric acid plant, two inactive cyanide heap leach basins, 11 settling ponds, and two hot spring feed ponds are located along the east bank of the Dolores River approximately 1/4 to 3/4 miles north of the town of Rico (Figure 2). Water from the underground mine working associated with the Rico-Argentine site drains from the mine to the St. Louis Tunnel adit, where it flows into the settling pond system prior to discharging into the Dolores River (URS 1995a; URS 1995b).

The Rico-Argentine has a National Pollutant Discharge Elimination System (NPDES) permit (#CO-0029793) dating from 1976, and has frequently been in violation of permit standards (U.S. Environmental Protection Agency (EPA) 1994). The discharge has also been regulated under the Colorado Pollutant Discharge Elimination System (CPDES). The discharge averages approximately 1.1 million to 1.5 million gallons per day (EPA 1994).

The Rico, Colorado, area has been heavily mined and several potential sources of contamination, primarily settling ponds and tailings piles, have been identified along Silver Creek and the Dolores River (URS 1995a). The exact origin of all of the specific potential sources is unknown. The area surrounding the Rico-Argentine site is primarily Bureau of Land Management (BLM) land located within the San Juan National Forest, with surrounding peaks reaching 14,000 feet above mean sea level (msl) and summits in the local Rico Mountains reaching more than 12,000 feet above msl. The town of Rico and the settling ponds along the east bank of the Dolores River are at 8,800 feet above msl and the Rico-Argentine Mill and tailings along Silver Creek are at 9,200 feet above msl (USGS 1960).

3.3 SITE HISTORY AND PREVIOUS WORK

The Rico area has an extended mining history of which a detailed account can be found in the Site Inspection Prioritization Report (URS 1994). Early mining activity in the Rico area began in the 1860s when several claims were staked in the Pioneer District at the confluence of Silver Creek with the Dolores River. Silver production reached a peak in 1893. In 1902, all of the important mines in the district were consolidated under the United Rico Mine Company which primarily produced base metal ores. The Rico-Argentine Mining Company, was formed in 1915 to produce base metal ores. A custom mill was built in 1926 by the International Smelting Company, a subsidiary of Anaconda Mining Company. Base metal ore production peaked in 1927 but by 1928 the mill had shut down and by 1932 all mining activity in the area had ceased (USGS 1974).

The Rico-Argentine Mining Company resumed sporadic mining activities in 1934 and resumed steady production in 1939 (State of Colorado, Department of Natural Resources, Bureau of Mines (BOM) 1939a; BOM 1939b). A sulfuric acid plant located north of the settling ponds along the Dolores River was operated between 1955 and 1964 (USGS 1974). All mining operations again ceased in 1971 and most of the mine workings were allowed to flood and drain through the St. Louis Tunnel (BOM 1971).

The Rico-Argentine Mining Company built a 300-foot by 500-foot leach pad next to the old sulfuric acid plant in 1973. A cyanide solution was used to leach silver and gold from raw ore, and an overflow of an unknown quantity of leaching liquor to the Dolores River occurred sometime in 1974 (BOM 1974). In 1975 an additional cyanide leach pad was constructed in a settling pond originally used by the acid plant (BOM 1975).

A Notice of Violation (NOV) and a Cease and Desist Order (CDO) were issued to the Rico-Argentine Mining Company in 1990 by the Colorado Department of Health and Water Quality Control Division because of the company's failure to meet the compliance of its NPDES permit (EPA 1994).

A review of the Colorado Department of Public Health and the Environment Water Quality Control Division's files, for the Rico-Argentine CDPS Permit No. CO-0029793, revealed the following discharge permit condition violations in 1995 (State of Colorado Department of Public Health and the Environment (CDPHE) 1988):

TABLE 1
Discharge Permit Condition Violations in 1995
(reported in mg/ℓ)

Report Period	Parameter	Reported Results	Permit Conditions
04/95	Total Recoverable Cadmium	0.0035 (30-day avg.)	0.0004 (30-day avg.)
04/95	Total Recoverable Zinc	0.57 (30-day avg.)	0.237 (30-day avg.)
05/95	Total Recoverable Cadmium	0.0065 (30-day avg.)	0.0004 (30-day avg.)
05/95	Total Recoverable Zinc	0.75 (30-day avg.)	0.237 (30-day avg.)
07/95	Total Recoverable Cadmium	0.0125 (30-day avg.)	0.0004 (30-day avg.)
07/95	Total Recoverable Zinc	2.85 (30-day avg.)	0.237 (30-day avg.)
09/95	Total Recoverable Cadmium	0.0025 (30-day avg.)	0.0004 (30-day avg.)
09/95	Total Recoverable Zinc	0.37 (30-day avg.)	0.237 (30-day avg.)

Anaconda purchased the property in 1980 and in response to the outstanding NOV and CDO, carried out several environmental efforts such as building a water treatment plant at the St. Louis Tunnel discharge, capping wells, plugging adits, and stabilizing tailings and treatment ponds (Anaconda Minerals Company (AMC) 1994).

The EPA collected surface water and sediment samples from Silver Creek and the Dolores River during a site inspection conducted in November 1984. Analytical results indicated that the surface water and sediments contained elevated concentrations of arsenic, cadmium, copper, iron, lead, manganese and zinc (Ecology and Environment (E&E) 1985).

Rico Development Corporation purchased the property in 1988 (CDPHE 1988). NOVs and CDOs were issued to Rico Development Corporation in 1990 for violations of the NPDES permitted discharge levels of lead and silver standards, in 1993 for violations of the silver standards, and in 1994 for violations of silver, lead and zinc standards (CDPHE 1995; EPA 1994).

The U.S. Department of Interior, Bureau of Reclamation conducted surface water and sediment sampling in the Dolores River and its tributaries between 1989 and 1993. The results show Silver Creek to be a major, but not the only, source of mercury and other heavy metals in the upper Dolores River Basin (U.S. Department of the Interior, Bureau of Reclamation, undated).

The Atlantic Richfield Corporation (ARCO) has initiated a voluntary environmental site characterization of the town of Rico and surrounding area within the framework of the Colorado Voluntary Cleanup and Redevelopment Act (PTI Environmental Services and ESA Consultants 1995).

3.4 SITE GEOLOGY

Detailed information about the geology of the Rico, Colorado, area can be found in "Geology and Ore Deposits of the Rico District, Colorado," by Edwin T. McKnight (USGS 1974). The geology of the Rico District is extremely complex in detail. The dominant structure of the district is a faulted dome centered on a monzonite stock. Sedimentary strata exposed in the area are the Ouray and Leadville limestones, overlain by the Hermosa Formation, whose limestone beds are the source of the district's massive sulfide ore deposits. The youngest sedimentary strata in the Rico District is the red beds of the Cutler Formation. The lower slopes of the Rico District are generally covered by debris resulting from wash, talus and landslide processes (USGS 1974). Surface materials in the valley sides and bottoms are glacial or stream deposits (URS 1995c).

3.5 SITE HYDROGEOLOGY

A shallow unconfined aquifer is located in the glacial, stream, wash, talus and landslide debris found along the valley floors. Groundwater in the shallow aquifer would be greatly influenced by seasonal weather conditions and the nearby surface water bodies. Conductivity is assumed to be high, between 10^{-2} to 10^{1} centimeters per second (cm/sec) (USGS 1987). Groundwater flow should follow the valley contours.

Deeper bedrock aquifers are found at the site. Several exploratory drill holes along the Dolores River portion of the site flowed water and were capped (AMC 1988; AMC 1994). Two exposed and several underwater geothermal springs are found along the Dolores River. Water quality data in Table 2 from the two exposed geothermal springs indicates a common source. Water flowing from these springs is depositing calcium carbonate and iron about the springs and there are visible geothermal deposits between the springs and the town of Rico (URS 1995a; URS 1995c).

TABLE 2
Geothermal Springs Water Quality (9-12-95)

	Water Temp. (°F)	pH (Std Units)	Conductivity (µs/cm)	Flow (gal/min)
Hot Tub Spring	107.9	6.60	7,280	30-50
2nd Hot Spring	107.3	6.66	7,080	15-20

3.6 SITE HYDROLOGY

The Rico-Argentine site is located in the Dolores River Basin. The Dolores River and its tributary Silver Creek are the major surface water bodies in the area. The Dolores River flows to the south past the St. Louis Tunnel adit, the old sulfuric acid plant, the cyanide heap leach basins, the tailings piles, settling ponds and the NPDES Outfall 002 (Figure 2). Silver Creek flows from the east, past the old mill site and several tailings piles and through the town of Rico before joining the Dolores River west of Rico (Figure 2). The 41-year annual mean flow on the Dolores River,

approximately four miles below the town of Rico, is 136 cubic feet per second (cfs) and the upstream drainage basin encompasses 105 square miles (USGS 1993). The flow rate of Silver Creek was measured during the September 14, 1995, field work at sample station RA-SW/SE-07 (Figure 2). The average of three readings was 10.1 cfs and the upstream drainage basin of Silver Creek encompasses an estimated seven square miles (USGS 1976; URS 1995b).

3.7 SITE METEOROLOGY

The Rico-Argentine site is located in a semiarid climate zone. The mean annual precipitation, as totaled from the University of Delaware (UD) database, is 12.8 inches. The net annual precipitation as calculated from precipitation and evaporation data obtained from the UD is 4.1 inches (University of Delaware (UD) 1986). The 2-year, 24-hour rainfall event for the site is approximately 1.5 inches (Dunne and Leopold 1978).

4.0 FIELD OPERATIONS

Field operations for the Rico-Argentine ESI included the collections of groundwater, surface water, sediment, residential soil and source samples. Other tasks performed during the field operations at the site included wetlands characterization, stream flow measurements, interviews with local residents, characterization of thermal springs and measurement of field water quality parameters for non-sampled tributary streams of the Dolores River.

4.1 SAMPLE COLLECTION ACTIVITIES

Sampling activities included the collection of 45 samples, specifically 16 source, 1 groundwater, 11 stream surface water, 11 stream sediment and 6 residential soil samples. Additionally, 9 QA/QC samples plus a laboratory MS/MSD were collected. Table 3 lists the sample locations and rationale for each sample.

4.2 NON SAMPLE COLLECTION FIELD ACTIVITIES

The following non-sampling activities were conducted during the Rico-Argentine ESI (URS 1995b):

- Delineation and characterization of wetlands along the Dolores River for approximately one mile downstream of the confluence with Silver Creek.

  Unconsolidated bottom land obligate wetlands were identified along the Dolores River downstream of the confluence with Silver Creek. Individual wetlands are less than one acre in size. Obligate emergent wetlands are located immediately south of Rico and approximately one mile south of the confluence of Silver Creek and the Dolores River, on the Dolores River between sample stations RA-07 and RA-08 (Figure 2). The wetlands on the west side of the Dolores River cover approximately two to three acres and the wetlands on the east side of the river are less than one acre in size.

- Measuring the flow of the NPDES Outfall 002 flume, Silver Creek and the Dolores River within the site boundaries on September 15, 1996. Site investigators employed a Marsh McBirney flow meter to measure these flows.

  The flow of the NPDES Outfall 002 flume was measured and determined to be 6.25 cfs or approximately 540,000 cubic feet per day.

  Three stream flow measurements were taken of Silver Creek at sample station RA-07 (Figure 2). These flow measurements were 10.35 cfs, 11.00 cfs, and 8.96 cfs. The average of these three readings is 10.1 cfs, or approximately 872,000 cubic feet per day.

  The flow of the Dolores River was measured and determined from a single measurement taken between sample stations RA-02 and RA-03 (Figure 2). The flow was measured at 48.16 cfs or approximately 4,160,000 cubic feet per day. This flow measurement

compares well with the flow published for the U.S. Geological Survey's (USGS's) Montelores Bridge gauging station downstream of Rico (Figure 2) which for September 15, 1993 was 51 cfs and for September 15, 1994, was 69 cfs (USGS 1993; USGS 1994).

- Interviewing local residents to determine if any anecdotal evidence could be discovered concerning use of mine tailings as fill or construction material in the town of Rico.

  The field teams interviewed over a dozen local residents, many of whom have lived in Rico for decades. No construction or fill materials were positively identified by local residents as derived from mine tailings. Material which the residents or field crews believed were characteristic of mine tailings were preferentially sampled.

- Characterization of thermal springs by measuring flow and the field parameters of pH, conductivity and water temperature.

  Field water quality readings were taken and flow estimated for the two subaerial thermal springs located at the site (Table 2). Similar water quality parameters indicate a common source. Several other hot springs were noted to be bubbling through ponds located south of the settling ponds.

- Measuring field water quality parameters of pH, conductivity and water temperature of six tributary streams entering the Dolores River below the town of Rico, Colorado, as a screen for unusual conditions which would trigger sampling.

  All tributary streams exhibited normal ranges of pH, conductivity and temperature. No opportunity sampling of the tributaries was required.

5.0 ANALYTICAL DATA

5.1 DATA VALIDATION AND INTERPRETATION

The sample data collected during this ESI was reviewed using the HRS guidelines for analytical interpretation (Office of the Federal Register 1990). As reported in the analytical results in Tables 4 through 21, elevated concentrations of contaminants, as noted by a star (★), are determined by sample concentrations based on the following:

- If the sample concentrations are greater than or equal to three times the highest background sample concentrations and greater than or equal to five times the blank concentrations and greater than or equal to the sample quantitation limit (SQL); and

- If not detected in background or blank samples, the sample concentrations are greater than or equal to the SQL.

All data analyzed by the CLP RAS laboratories were validated by the Environmental Services Assistance Team (ESAT). All data are acceptable for use as qualified in the data validation report. The complete data validation report, laboratory forms and SQL calculations are located in Appendix D.

5.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

The results of QA/QC samples are presented in Tables 20 and 21. The inorganic analyses of field QA/QC samples included rinsate samples and indicate that the decontamination procedures were effective (Table 20). There are no confirmed detections of inorganic compounds that are above the Contract Required Quantitation Level (CRQL). The organic analyses of QA/QC samples included trip and rinsate blanks collected from de-ionized water in the field (Table 21). The QA/QC sample results presented in Table 21 show only detections of acetone and chloroform which are common laboratory contaminants. These laboratory contaminants have been corrected for in the final analytical results.

6.0 SOURCE CHARACTERIZATION

6.1 SOURCE SAMPLE LOCATIONS

Source Samples were collected from the two abandoned cyanide leach pits along the Dolores River (RA-WSO-01 and RA-WSO-02), a spring flowing from beneath the abandoned cyanide leach pits (RA-WSW-09), the St. Louis Tunnel outfall (RA-WGW-01), the hot-tub geothermal spring (RA-WGW-02) (Photo 5), the uppermost settling pond (RA-WSW-01/RA-WSE-01) (Photo 1), the lowermost settling pond (RA-WSW-02/RA-WSE-02), the drainage ditch between the upper settling ponds and the Dolores River (RA-WSW-03/RA-WSE-03) (Photo 4), the stained soil adjacent to a fuel tank at the mill site (RA-WSO-08), the tailings piles along upper Silver Creek, just below the old mill building (RA-WSO-03 and RA-WSO-04) (Photo 2), tailings at the confluence of Silver Creek and the Dolores River (RA-WSO-05), and from two tailings piles along the Dolores River south of Rico (RA-WSO-06 and RA WSO-07) (Photos 12 and 13). Please refer to Figure 2 for the exact sample locations and to Table 3 for sample rationale.

The source samples can be divided into three different groups: soils and tailings along Silver Creek and the Dolores River; the tailings ponds along the Dolores River; and the groundwater sources. The background for inorganic and organic soil parameters are found in Tables 9 and 10, as background sample RA-SO-01. Background for inorganic and organic surface water and sediment parameters are found in Tables 14 through 19 as background samples RA-SW-01 (Dolores River) and RA-SW-05 (Silver Creek). Background for inorganic and organic groundwater parameters can be found in Tables 10 and 11 as background sample RA-GW-01.

Source areas are posted but are not secured from public access. There are several locations along Silver Creek and the Dolores River where tailings were noted to be slumping into surface water bodies. The settling ponds along the Dolores River are in good condition and no evidence of a spill was located during the field work (URS 1995b).

6.2 SOURCE ANALYTICAL RESULTS

Source samples contained a total of six VOCs. Acetone, carbon disulfide, 2-butanone, 2-hexanone, tetrachloroethene, and toluene were all detected in source soils and tailings (Table 5). Only acetone and 2-butanone were detected, in a single sample, above the method detection limit. This sample was an opportunity sample from underneath a leaking fuel tank at the Silver Creek Mill site. A single acetone detection below the method detection limit, was reported in the uppermost settling pond (Table 7).

Source samples contained a total of 12 SVOCs. Chrysene, fluoranthene, bis(2-ethylhexyl) phthalate, di-n-octylphthalate, butylbenzylphthalate, di-n-butylphthalate, pyrene, phenanthrene, benzo (a) anthracene, benzo (b) fluoranthene, benzo (a) pyrene, and phenol were all detected below the method detection limit and flagged as estimated by the validator (Tables 5 and 7).

Source samples contained a total of 10 pesticides. Aldrin was detected in three samples below the method detection limit (Tables 5 and 7). All other pesticides were detected in the opportunity soil sample (RA-WSO-08, Table 5) from beneath a leaking fuel tank. The pesticides detected are aldrin, endosulfan II, endrin aldehyde, endrin ketone, heptachlor, gamma-Chlordane, 4,4'-DDE, 4,4'DDD, endosulfan sulfate, and methoxychlor. All detections were below the method detection limit except endrin ketone, 4,4'DDE and 4,4'DDD (Table 5).

Source samples were analyzed for cyanide. Background for cyanide in the Rico area is approximately 0.5 parts per million (ppm). Source samples from the Rico-Argentine site can be divided into two groups, one group that is near background and one group that is approximately 10 times background. Source sediment/soil samples from the uppermost cyanide leach pit (RA-WSO-01), the tailings piles along Silver Creek (RA-WS0-03 and RA-WSO-04), and the uppermost settling pond (RA-WSE-01) all recorded cyanide levels greater than background and are reported as elevated concentrations (Tables 4 and 6).

Source samples that were analyzed for inorganic analytes other than cyanide indicated elevated concentrations above the background for aluminum, antimony, arsenic, barium, cadmium, calcium,

chromium, copper, iron, lead, mercury, nickel, selenium, silver, thallium and zinc (Tables 4 and 6). The analytical results were generally between approximately two to ten times background and are characteristic of mining waste material. Most of the elevated readings were from the tailings piles along Silver Creek and the Dolores River where cadmium, calcium, copper, iron, lead, silver and zinc occurred in most samples at between five to ten times background. There appears to be no discernable difference between the tailings along Silver Creek and the tailings along the Dolores River. The sample from the upper cyanide leach pit has elevated concentrations from background of aluminum, chromium, iron, lead, nickel and silver and the sample from the lower cyanide leach pit has slightly elevated concentrations from background of cadmium, copper, iron and nickel (Table 6). The samples from the settling ponds indicate that all the settling pond water and sediments have elevated concentrations of calcium. Calcium is used in the water treatment process to reduce the acidity of the mine water outfall (Anaconda Minerals Company 1994). Sediment in the uppermost (first) settling pond contains elevated concentrations of aluminum, antimony, arsenic, cadmium, calcium, copper, and lead; and the aqueous sample from the uppermost settling pond contains elevated levels of calcium and copper (Table 6).

7.0 GROUNDWATER PATHWAY

7.1 GROUNDWATER SAMPLE LOCATIONS

Only one groundwater sample was collected during this ESI. This groundwater sample was collected from the domestic well at the Rico Ranger Station, northwest of the site. Please refer to Figure 2 for the exact sample location and to Table 2 for the sample rationale. The sample was specifically collected from the spigot used as a source of water for the trailer where the summer staff lives on site. The well draws water from valley fill talus, landslide, and alluvial material, and is across the Dolores River (west) and topographically above the site (URS 1995c).

7.2 GROUNDWATER ANALYTICAL RESULTS AND TARGETS

Analytical results of the groundwater sample did not reveal the presence of any organic compounds (Table 9). Analytical results of the inorganic samples, both total and dissolved metals,

show detectable concentrations of barium, calcium, magnesium, manganese, potassium, sodium and zinc (Table 8). The detections and concentrations of inorganics detected in the groundwater well do not indicate contamination or contact with the source areas of the Rico-Argentine site.

8.0 RESIDENTIAL SOIL EXPOSURE PATHWAY

8.1 RESIDENTIAL SOIL SAMPLE LOCATIONS

Residential soil samples were collected from six properties within the town of Rico (Photos 7, 8, 9, 10, and 11). Please refer to Figure 2 and Table 3 for exact sample locations and rationale. Signed access agreements were obtained from all property owners before the sample was taken. Samples were taken from areas on the properties that the field crew or residents believed could potentially contain fill material derived from local mine workings.

8.2 RESIDENTIAL SOIL ANALYTICAL RESULTS AND TARGETS

There were no detections of VOCs in any of the residential soil samples (Table 9). There were detections of 17 SVOCs, primarily in samples RA-SO-02, RA-SO-04 and RA-SO-05, and estimated detections of three SVOCs were made in sample RA-SO-06. The compounds detected were generally qualified as estimated, except for detections at RA-SO-02, because quality control criteria were not met. Minor estimated detections of three SVOCs were made in sample RA-SO-06. The compounds positively identified from sample RA-SO-02 are fluoranthene, pyrene, benzo (a) anthracene, chrysene, benzo (b) fluoranthene, benzo (k) fluoranthene, and benzo (a) pyrene.

Pesticides were detected in small amounts in all samples at low concentrations, which were estimated because quality control criteria were not met (Table 13). The pesticides detected were endosulfate, 4,4'-DDD, heptachlor, aldrin, heptachlor epoxide, endosulfan I, 4,4'-DDE, endrin, 4,4'-DDT, endrin ketone, alpha-chlordane, gamma-chlordane, and delta-BHC. These compounds could be expected to be present if commercial pesticides were used at these homes. These compounds are not associated with any Rico-Argentine source.

The inorganic results for two of the residential soil samples, RA-SO-03 and RA-SO-05, were very close to background. Four of the samples, RA-SO-02, RA-SO-04, RA-SO-06 and RA-SO-07, exhibited elevated concentrations of inorganics (Table 12). Elevated concentrations of copper were found in four samples. Elevated concentrations of lead were found in three samples, RA-SO-02, RA-SO-04, and RA-SO-07. Elevated concentrations of antimony, arsenic, manganese, mercury, silver, and zinc were found in at least two samples. Single detections, at separate locations, of cadmium, calcium, sodium, magnesium, vanadium and cyanide were recorded at elevated concentrations. When these locations are plotted on a map, the area defined by these elevated concentrations is approximately 776,000 square feet.

9.0 SURFACE WATER AND SEDIMENT PATHWAY

9.1 AQUEOUS AND SEDIMENT SAMPLE LOCATIONS

Three surface water and sediment samples, including a specific background sample, were collected from Silver Creek. Eight surface water and sediment samples, including a specific background sample, were collected from the Dolores River. Please refer to Figure 2 and Table 3 for exact sample locations and rationale.

The analytical results for each drainage are presented separately in the following discussions.

9.2 SILVER CREEK - AQUEOUS AND SEDIMENT ANALYTICAL RESULTS AND TARGETS

The background sample on Silver Creek (RA-SW/SE-05) was taken just upstream from the Rico municipal drinking water intake (Figure 1). A review of the analytical results presented in Tables 14 and 15 for Silver Creek and in Tables 16, 17, 18 and 19 for the Dolores River indicate that background conditions in both streams are similar.

Two qualified detections of tetrachloroethene (PCE) were made in sediment from Silver Creek (samples RA-SE-06 and RA-SE-07) (Table 15). Both detections are estimated values that are

below the detection limit. There was also a very low level estimated detection of tetrachloroethene made in the source sample RA-WSO-03 (Table 5) which was taken from tailings along upper Silver Creek.

Phthalates were detected from the background sample (RA-SE-05) and from the sample just below the tailings (RA-SE-06). The detections are probably the result of sample collection or laboratory contamination. The sediment in Silver Creek tended to be composed of cobbles and boulders and considerable digging and picking were required to collect a sufficient quantity of fine-grained sediment for analysis.

Elevated concentrations of iron, manganese, and zinc were detected in both of the downstream aqueous samples (Table 14). The samplers noted that water seemed to be seeping from beneath the tailings pile directly into the creek. The concentrations decreased from the sample station just below the Silver Creek tailings piles (RA-SE-06) to the sample station located on Silver Creek just before the confluence with the Dolores River (RA-SW-07). Photo 3 shows the rusty-colored iron staining near the location of sample station RA-SW-06. The rusty-colored staining was less noticeable at RA-SW-07.

Elevated concentrations of 14 inorganics were detected from sediment at sample station RA-SE-06 (Table 14). The sampling crew noted that the stream was in direct contact with the tailings. It was observed that tailings were slumping into the creek and that the creek bed appeared to be composed entirely of fine-grained tailings material derived from the tailings piles along the creek. Most of the elevated concentrations of inorganics were flagged by the validator as estimated because of the dilution required before the concentrated sample could be analyzed. Three metals were positively identified: beryllium, copper and selenium. Ten metals were identified and their quantity estimated because quality control criteria were not met. These 10 metals are aluminum, arsenic, cadmium, calcium, iron, lead, manganese, nickel, silver, and zinc.

An unqualified elevated concentration of copper was detected at RA-SE-07 located on Silver Creek just before the confluence with the Dolores River (Table 14). Elevated concentrations with estimated values were detected at RA-SE-07 for six inorganic compounds: arsenic, iron, lead,

manganese, silver, and zinc. Elevated concentrations at the downstream Silver Creek sample location (RA-SE-07) were between one-half to one-tenth those of the upstream location (RA-SE-06). Seven inorganic compounds, aluminum, beryllium, cadmium, calcium, nickel, selenium, and cyanide that were detected at elevated concentrations at the upper sample station (RA-SE-06) were not detected at elevated concentrations at the lower sample station (RA-SE-07).

A survey of Silver Creek from the Rico municipal water intake to the confluence with the Dolores River (Figure 2) performed during the URS field sampling in September 1995 did not detect any wetlands or evidence of a fishery. The flow of Silver Creek was determined to be approximately 10.1 cfs (see Section 4.2). Concrete reinforced rip-rap was in place along the upper end of the tailings pile along the Silver Creek stream course. This containment prevented the tailings from entering the stream. There were no containment features along the more downstream reaches of Silver Creek where tailings were coming into direct contact with the stream, as noted at sample location RA-SW/SE-06 (URS 1995b).

9.3 DOLORES RIVER - AQUEOUS AND SEDIMENT ANALYTICAL RESULTS AND TARGETS

Eight aqueous and sediment samples were taken along the Dolores River. The background sample was taken on the east bank of the river, across from the Rico Ranger Station. There is no indication, either physical or analytical, that the background location is influenced by the site.

The aqueous organic samples (Table 17) indicated only one isolated very low level detection of carbon disulfide at RA-SW-09. This location is south (downstream) of Rico and adjacent to approximately one acre of wetlands (Figure 2). This single organic detection does not appear to be related to any identifiable source.

The aqueous inorganic samples (Table 16) present a more consistent picture. Iron and manganese are found at elevated concentrations in all Dolores River samples downstream of the background sample (RA-SW-01). Zinc is detected at elevated concentrations in all Dolores River aqueous samples below RA-SW-02 (Figure 2). The highest concentrations of iron, manganese, zinc and

copper are also found in aqueous sample RA-SW-08. Iron at this location is 54 times background, manganese is 20 times background, zinc is 68 times background, and copper is 8 times background. These elevated concentrations cannot be traced directly back to Silver Creek or the Outfall 002 from the settling ponds, since concentrations actually decrease at the previous sample location on the Dolores River (RA-SW-04).

There are also elevated concentrations of aluminum from sample stations RA-SW-02 and RA-SW-08. These two stations report aluminum concentrations that are approximately ten times background and there is no apparent source for these concentrations. All other sample stations report aluminum readings near background (Table 16).

Organic sediment sample results from the Dolores River (Table 19) report an estimated result for tetrachloroethene at RA-SE-08. An elevated concentration of acetone is reported in the duplicate (RA-SE-11) and is probably due to laboratory contamination. Phthalates are reported at low concentrations in several samples and are probably the results of sample collection or laboratory contamination. 4-methylphenol is also estimated to be present below the detection limit in the most downstream sample and in the duplicate of that sample (RA-SE-10 and RA-SE-11). This is most likely the result of laboratory contamination.

Elevated concentrations of inorganic compounds are recorded at two sample stations on the Dolores River, stations RA-SE-08 and RA-SE-09 (Table 19 and Figure 2). Both of these sample stations are located near tailings piles that are being actively eroded by the Dolores River (Photos 12 and 13). There are no elevated concentrations of inorganic compounds reported for any other sediment sample along the Dolores River (Table 18). Copper is positively identified at elevated concentrations at both sample stations. The copper in the sediment is elevated to 9 times background at sample station RA-SE-08 and to 5.5 times background at the next most downstream location, RA-SE-09. Lead, manganese, and zinc are all detected at estimated quantities, below the detection limit but above background, at RA-SE-08 and RA-SE-09. The concentrations of lead, manganese, and zinc in the sediment range from three to five times background..

There is substantial evidence of sport fishing along the Dolores River in the Rico area. The field sampling crews observed and interviewed several cold water trout fisherman, particularly below Rico, between sample stations RA-SE/SW-08 and RA-SE/SW-10 (URS 1995b).

The field crew also measured and classified several wetlands for one mile along the Dolores River between the confluence of Silver Creek with the Dolores River and RA-SW/SE-09 (see section 4.2). Several small wetlands (less than one acre) were noted for the first three-quarters of a mile. A larger palustrine scrub/shrub (obligate) wetland, approximately five acres in size, was documented between three-quarters of a mile and one mile downstream of the Silver Creek/Dolores River confluence (Figure 2).

10.0 SUMMARY

Field work conducted at the Rico Argentine site in Rico, Colorado, during the week of September 11 through September 15, 1995, involved the collection of samples for laboratory analyses and non-sampling site specific information. This information has been used in this report to evaluate pathways and associated targets to determine if the Rico Argentine site potentially impacts the environment or human health.

The air pathway was not evaluated during this site inspection because no evidence was discovered during the background research which would indicate that a potential release to the air pathway was possible.

No groundwater users were identified during the field work. The only groundwater well located was the background well at the Rico Ranger Station. Data collected for this site inspection was inconclusive regarding the groundwater pathway.

Soil samples were collected from six residences. Organic compounds found in the residential soil samples can not be directly attributed to the site and are most likely the result of activities occurring at each specific residence. Samples from four of the residences had elevated concentrations of metals, which indicate that tailings material, from an unspecified source, could have been used as fill on the property. These locations define the boundaries of an area that covers approximately 766,000 square feet.

Aqueous and sediment samples were taken from Silver Creek and the Dolores River. The results of these samples indicate that there are localized incidents of metals entering the surface water and sediment of these streams from tailings that are not contained. Areas that appear to be potential sources of contamination are the lower part of the tailings piles on Silver Creek and the tailings piles that are being actively eroded along the Dolores River, south of Rico. These tailings piles appear to be a source for localized contamination that occurs immediately downstream of the tailings piles on Silver Creek and the Dolores River.

Source areas which are controlled by engineered containment features, such as the berm on the tailings on upper Silver Creek and the water treatment and settling pond system for the St. Louis Discharge do not appear to be the source for elevated concentration of metals in the surface waters and sediments of Silver Creek and the Dolores River. A review of the water quality data for the Dolores River ("pH on Dolores River" (Figure 3) and "Conductivity on Dolores River" (Figure 4) in Appendix A - Sample Activities Report) indicate that Outfall 002 and Silver Creek significantly influence water quality on the Dolores River at their respective points of confluence. A review of the analytical data from samples collected for this ESI indicates that Outfall 002 and Silver Creek are not the probable source of metals contamination in the Dolores River.

11.0 LIST OF REFERENCES

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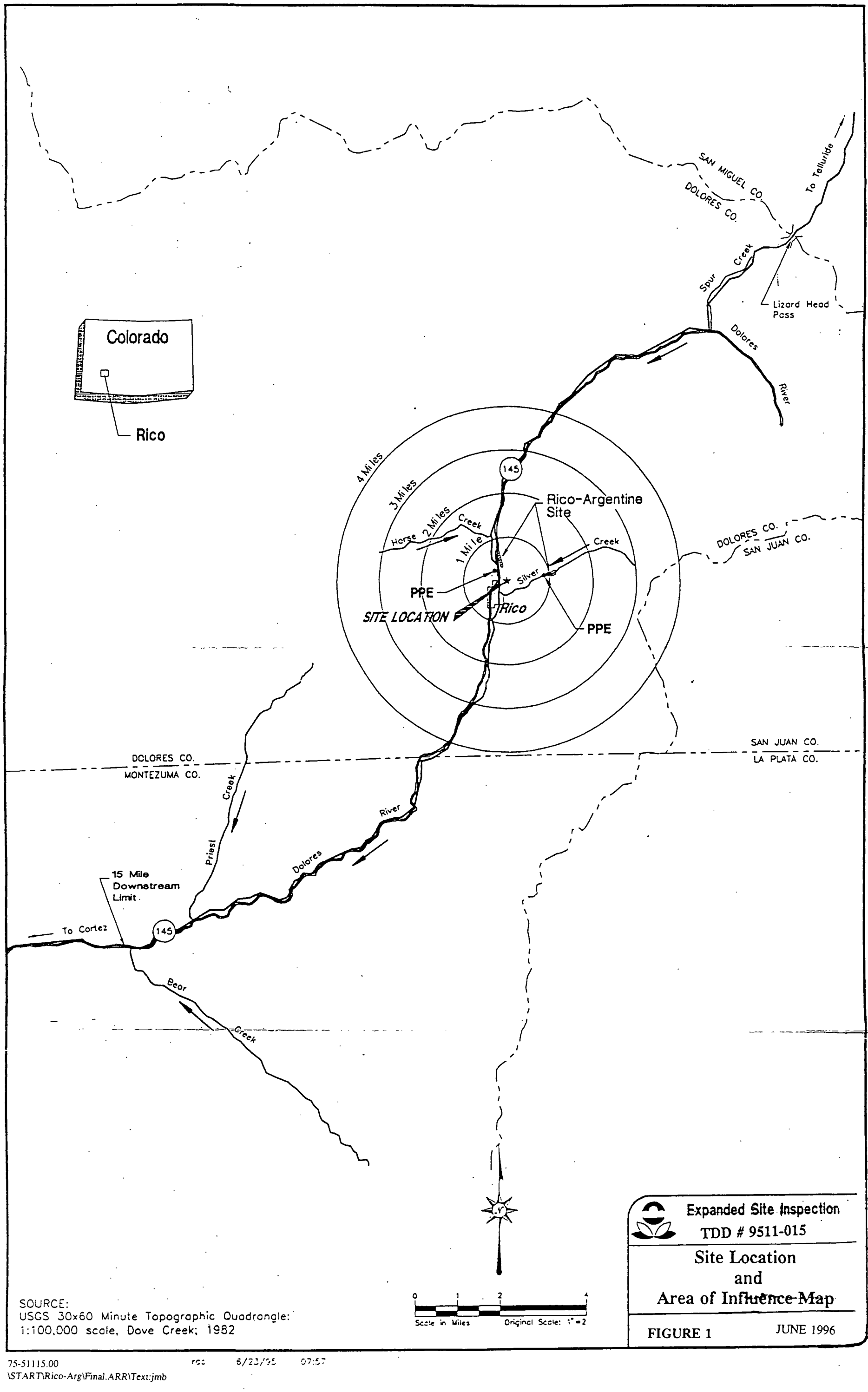
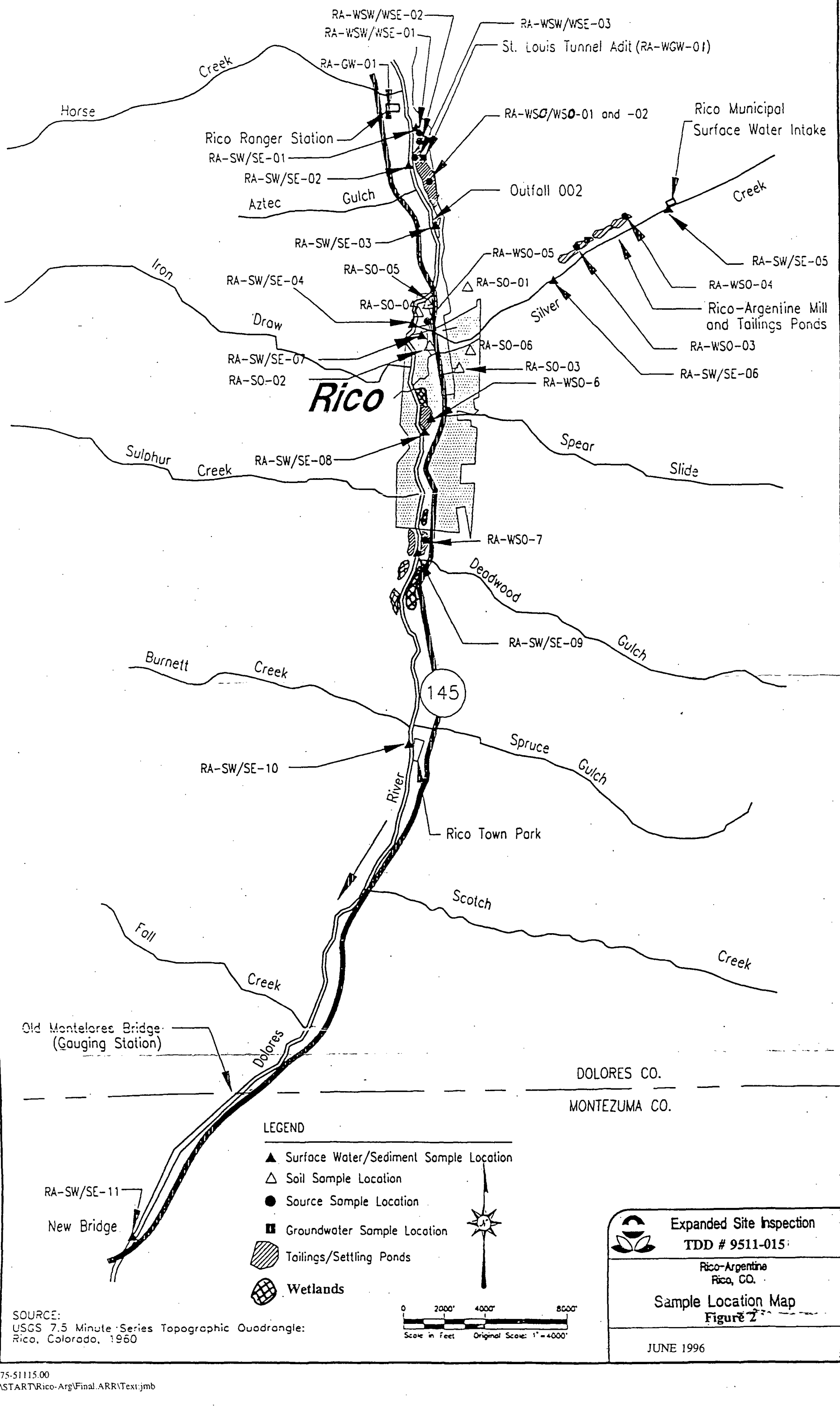


SOURCE:
USGS 30x60 Minute Topographic Quadrangle:
1:100,000 scale, Dove Creek; 1982

Expanded Site Inspection
TDD # 9511-015

Site Location and Area of Influence Map

FIGURE 1 JUNE 1996



SOURCE:
USGS 7.5 Minute Series Topographic Quadrangle:
Rico, Colorado, 1960

Expanded Site Inspection
TDD # 9511-015

Rico-Argentine
Rico, CO.

Sample Location Map
Figure 2

JUNE 1996

TARGET SHEET

EPA REGION VIII

SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOCUMENT NUMBER: 374989

SITE NAME: RICO ARGENTINE/RICO POND

DOCUMENT DATE: 06/19/1996

DOCUMENT NOT SCANNED

Due to one of the following reasons:

☐ PHOTOGRAPHS

☐ 3-DIMENSIONAL

☐ OVERSIZED

☐ AUDIO/VISUAL

☐ PERMANENTLY BOUND DOCUMENTS

☐ POOR LEGIBILITY

☐ OTHER

☐ NOT AVAILABLE

☑ TYPES OF DOCUMENTS NOT TO BE SCANNED
(Data Packages, Data Validation, Sampling Data, CBI, Chain of Custody)

DOCUMENT DESCRIPTION:

TABLES 1 and 2 missing
TABLES 3 through 21 (See Table of Contents)

Contact the Superfund Records Center to view available document.
(303) 312-6473

TARGET SHEET

EPA REGION VIII

SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOCUMENT NUMBER: 374989

SITE NAME: RICO ARGENTINE/RICO POND

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- ☐ PERMANENTLY BOUND DOCUMENTS
- ☐ POOR LEGIBILITY
- ☐ OTHER
- ☐ NOT AVAILABLE
- ☑ TYPES OF DOCUMENTS NOT TO BE SCANNED
  (Data Packages, Data Validation, Sampling Data, CBI, Chain of Custody)

DOCUMENT DESCRIPTION:

APPENDIX A - Sample Activities Report

Contact the Superfund Records Center to view available document.
(303) 312-6473

APPENDIX B

PHOTOLOG

Color Photo(s)

The following pages contain color that does not appear in the scanned images.

To view the actual images, please contact the Superfund Records Center at (303) 312-6473.

PHOTO 1

Sample location RA-WSW/WSE-01. St. Louis Tunnel. Uppermost of settling ponds. Outfall is in the upper right corner under the little shack. Water in the pond is about six to eight inches deep. Iron staining is from sediment.

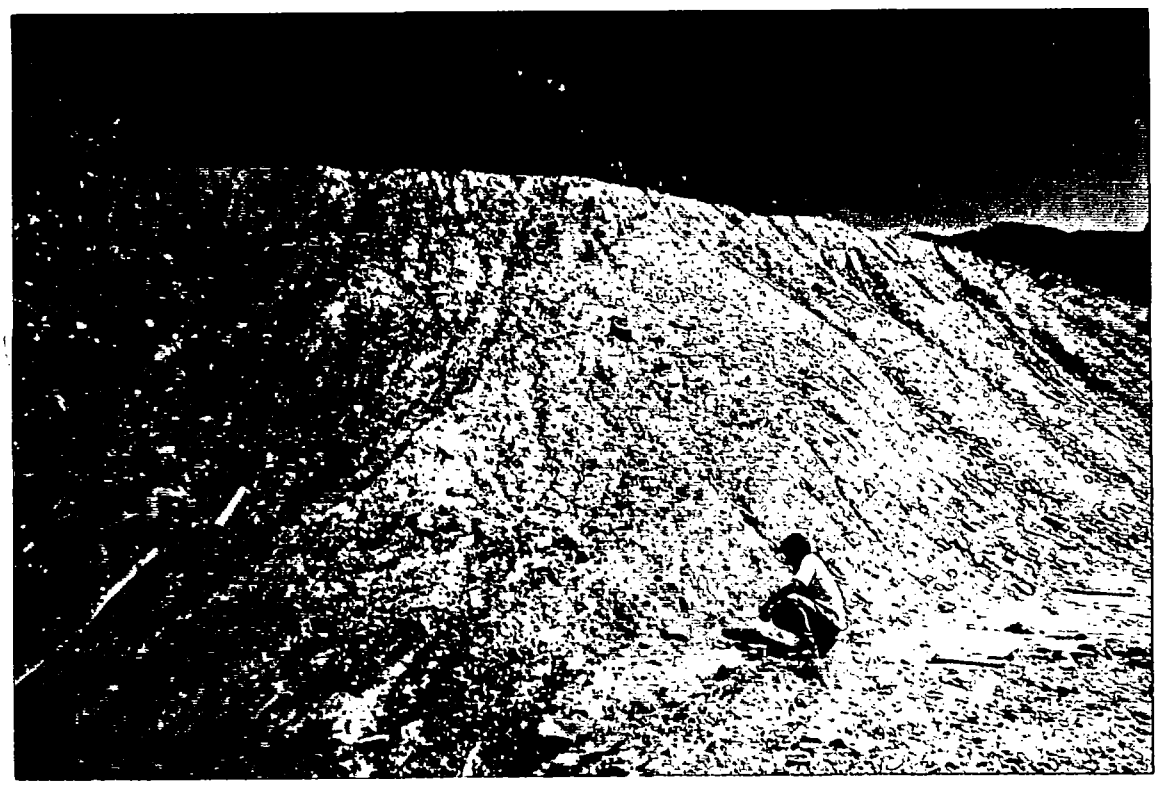

PHOTO 2

Sample location RA-WSO-03. T. Joseph collecting sample from the tailings pile on the north bank of Silver Creek.

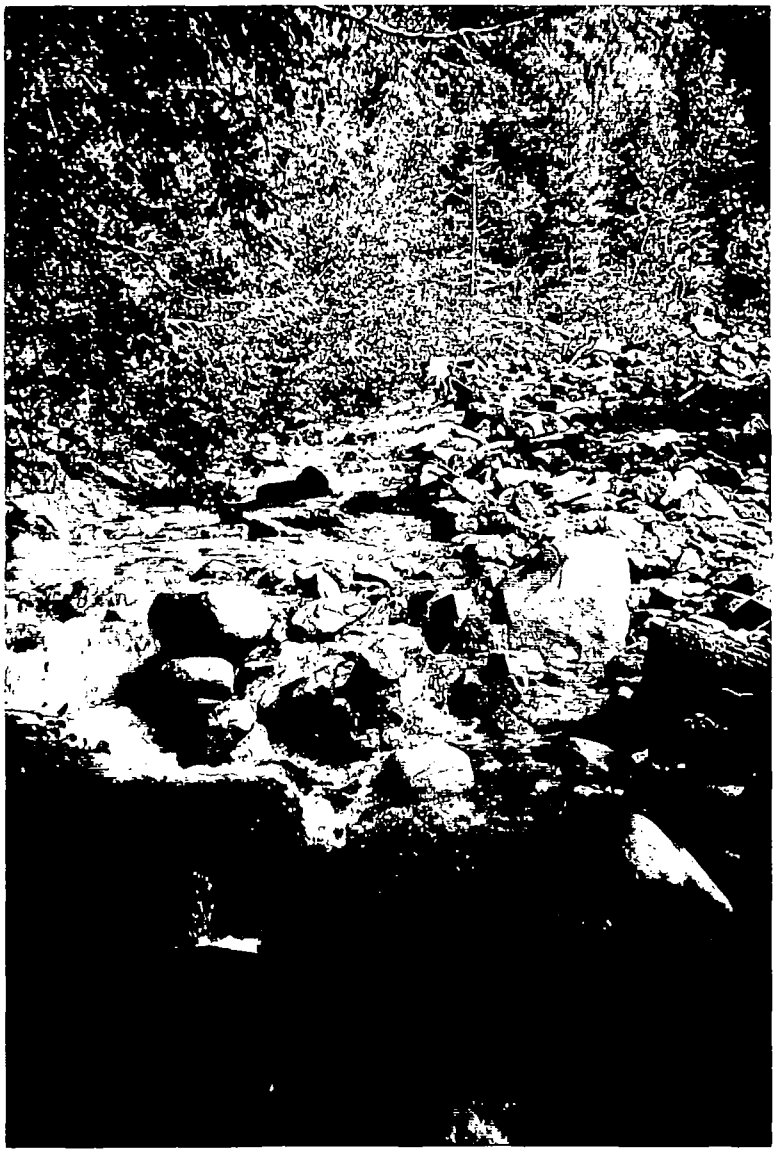

PHOTO 3

Silver Creek upstream of sample location RA-SW/SE-06. Note the rusty-colored iron staining of cobbles in the stream bed.

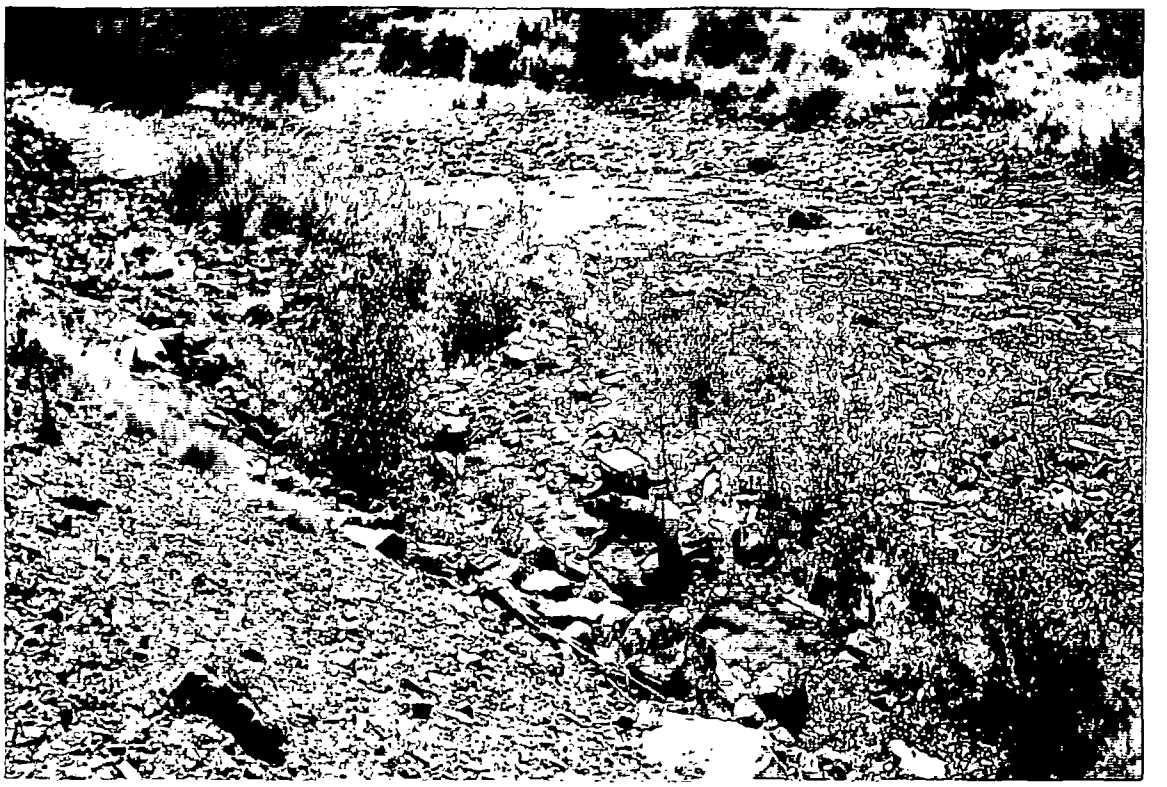

PHOTO 4

Sample RA-WSW/WSE-03 taken from the ditch between the upper settling ponds and the Dolores River. Note the orange staining.

PHOTO 5

R. Badger taking sample RA-WGW-02 from PVC pipe leading into the community-use hot tub. Note the iron oxide stained carbonate deposits around the tub.

PHOTO 6

Second hot spring from the hot spring area. Note water is forcibly ejecting. Flow is about 15 to 20 gallons per minute. Note iron stained carbonate deposits.

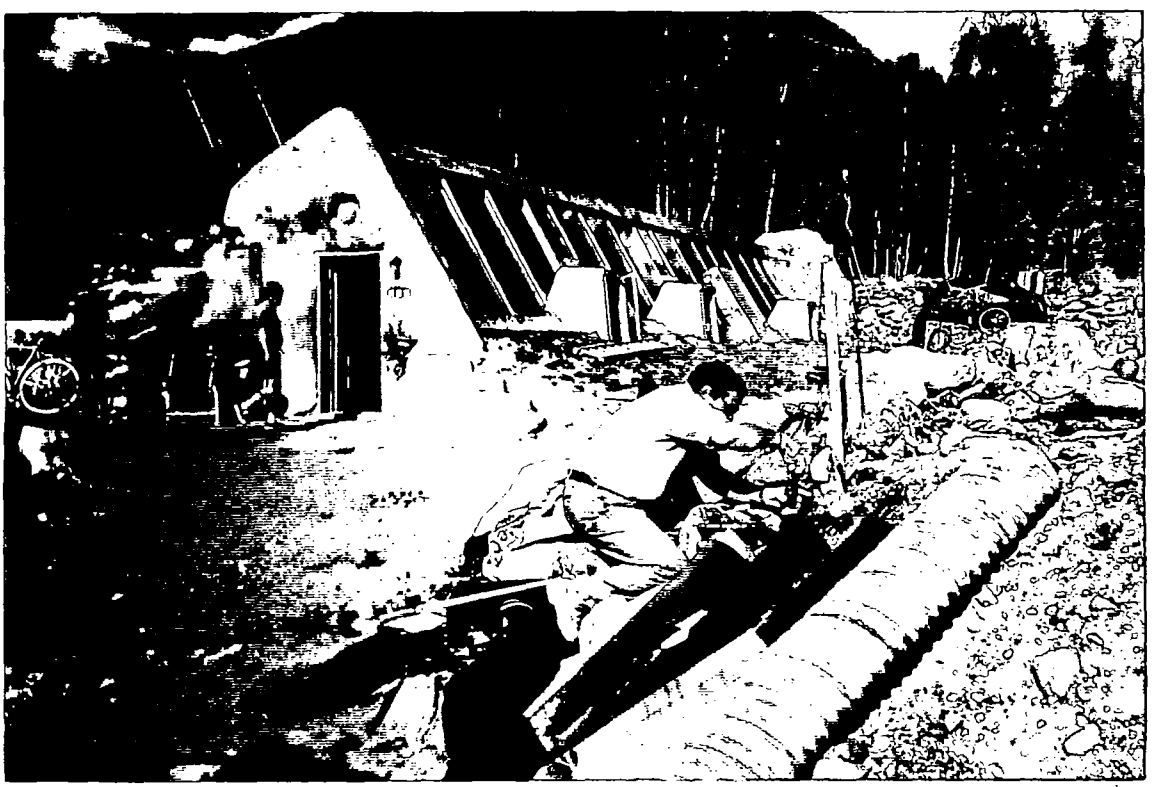

PHOTO 7

R. Petrella collecting Residential Soil Sample RA-SO-02 at the Lindaur residence.

M. Leslie collecting Residential Soil Sample RA-SO-03 at the Folsom residence.

PHOTO 9

M. Leslie collecting Residential Soil Sample RA-SO-04 at the Hogan Residence.

PHOTO 10

M. Leslie collecting Residential Soil Sample RA-SO-05 at the Ferando residence.

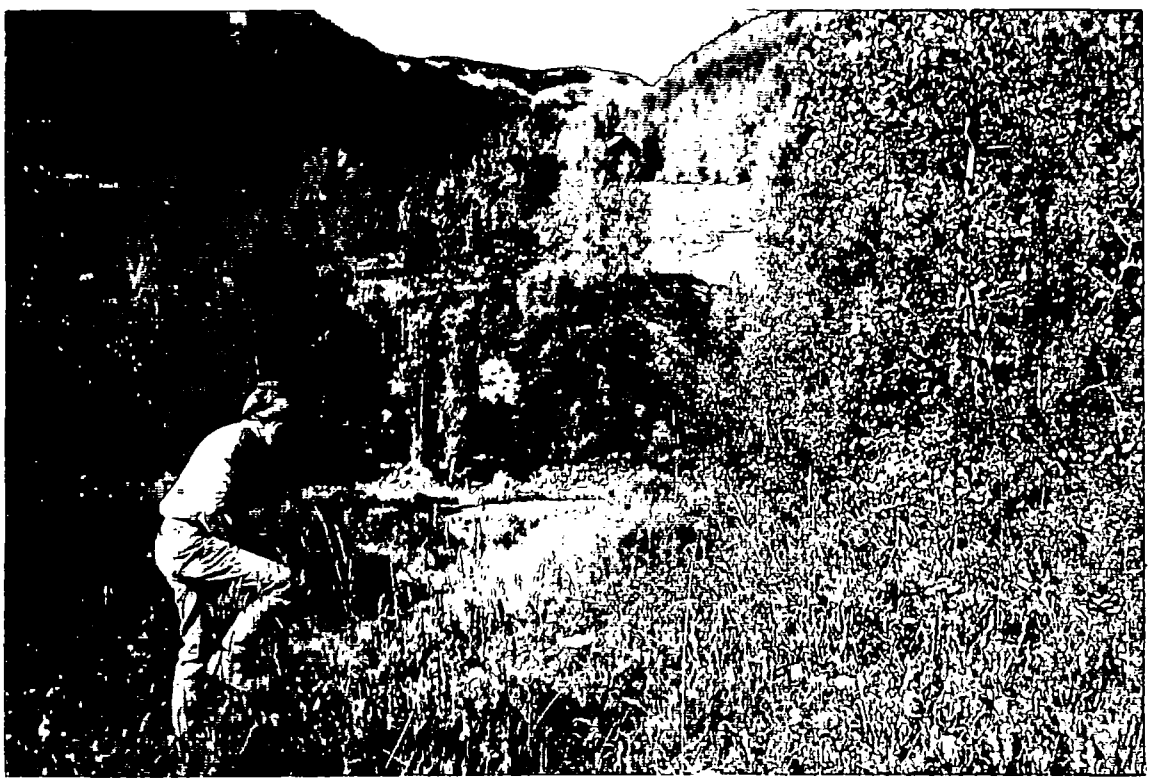

PHOTO 11

R. Badger collecting Residential Soil Sample RA-SO-06 at the Kneppel residence.

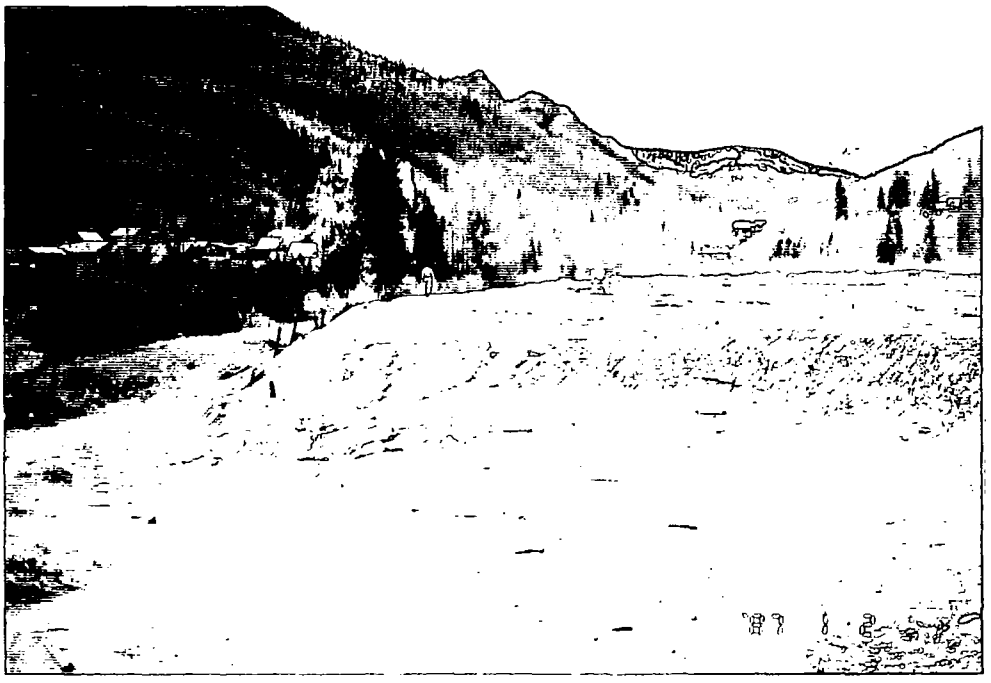

PHOTO 12

View of tailings pile at RA-SW/SE-08 just south of town of Rico. Dolores River is on the left side of photo where it is actively eroding the tailings. Tailings were sampled as RA-WSO-06.

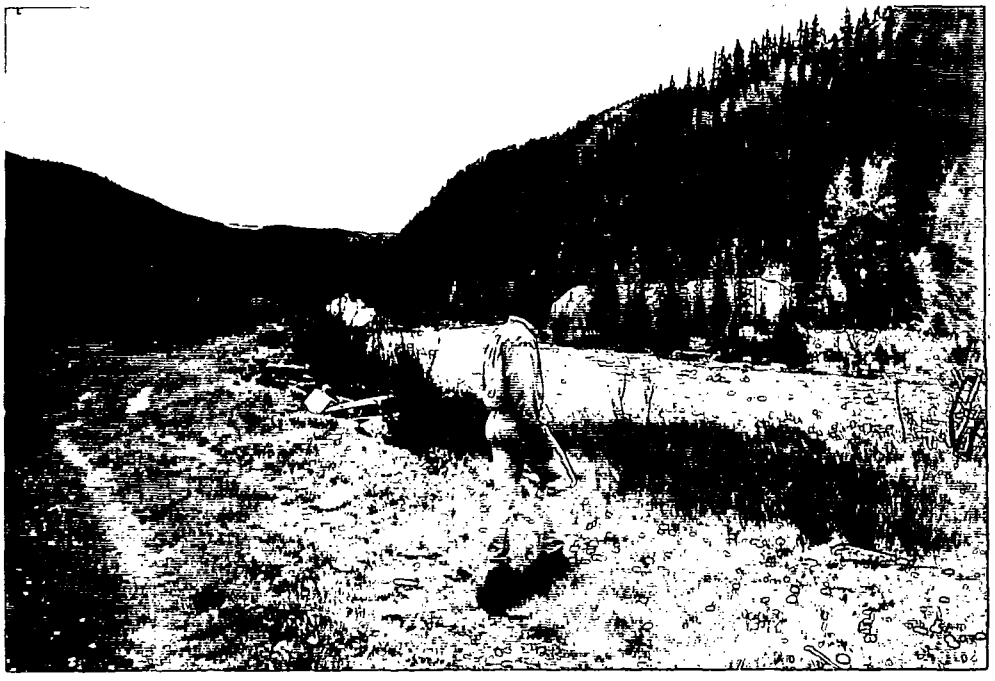

PHOTO 13

View to south along Dolores River of tailings pile split by Dolores River at RA-SW/SE-09. Tailings on left (east) side of river were sampled as RA-WS0-09.

APPENDIX C

SITE INSPECTION DATA SUMMARY

SI Data Summary Site Name Rico-Argentine

Site Name Rico-Argentine EPA Region VIII Date 7/96

Contractor Name or State Office and Address UOS 1099 18th St.
Denver CO 80202

GENERAL SITE INFORMATION

1. CERCLIS ID No. COD980952519

Address State Highway 145 City Rico

County Dolores State CO Zip Code 81332 Congressional District ____

2. Owner name Rico Development Corp Operator name Wayne Webster

Owner address P.O. Box 130 Operator address ____

City Rico State CO City ____ State ____

3. Type of ownership (check all that apply):
☒ Private ☐ Federal/Agency ____ ☐ State ☐ County ☐ Municipal
☐ Other ____ Reference(s) ____

4. Approximate size of property: 75 acres Reference(s) ____

5. Latitude 37° 42 .05" Longitude 108° 01 .39" Reference(s) USGS 1960

6. Site status: ☐ Active ☒ Inactive ☐ Unknown Reference(s) URS 1995

7. Years of operation: From: 1860 to: present ☐ Unknown Reference(s) URS 1995

8. Previous Investigations:

Type	Agency/State/Contractor	Date	
SI	EPA (TAT)	1984	Reference(s) E & E 1985
	Bureau of Reclamation	~~1971~~ ?	Reference(s) Bureau of Rec, undated
SIP	EPA (ARCS)	1994	Reference(s) URS 1994
			Reference(s)
			Reference(s)
			Reference(s)

SI Data Summary

Site Name Rico-Argentine

WASTE SOURCE INFORMATION

1. **Waste source types** (check all that apply)

- ☐ Constituent
- ☐ Wastestream (type) _____
- ☐ Landfill
- ☐ Drums
- ☒ Contaminated soil
- ☐ Land treatment
- ☐ Tanks or non-drum containers (type) _____
- ☐ Pile (type) _____
- ☐ Surface impoundment (buried)
- ☐ Surface impoundment (backfilled)
- ☒ Other settling ponds

Reference(s) UOS 1996

2. **Types of wastes** (check all that apply)

- ☐ Organic chemicals
- ☒ Inorganic chemicals
- ☐ Municipal wastes
- ☐ Radionuclides
- ☐ Metals
- ☐ Pesticides/Herbicides
- ☐ Solvents
- ☐ Other _____

Reference(s) UOS 1996

3. **Summarize history of waste disposal operations:**

Tailing piles are found alon both Silver Creek and the Dolores River, from past mining activities. Mineralized waters are seeping from belleth tailing piles along silver Creek into silver creek. Drainage from the mine workings is passed through a series of settling ponds and discharged into the river.

Reference(s) UOS 1996

SI Data Summary **Site Name** Rico-Argentine

4. **Source characterization** (Attach pages to show quantity and calculations.)

Source 1 name: Tailings piles along Silver Creek Source type Contaminated Soil

Describe source: Tailings piles along Silver Creek

Ground water migration containment: None

Surface water migration containment: None

Air migration (gas and migration) containment: None

Physical state of wastes: ☐ Liquid ☒ Solid ☐ Sludge/Slurry ☐ Gas ☐ Unknown
Constituent quantity of hazardous substances: _____ (specify units)
Wastestream quantity containing hazardous substances: _____ (specify units)
Volume of source (yd^3): _____ Area of source (ft^2): 600,000

Hazardous substances associated with source 1:

Cadmium	Arsenic	Mercury
Copper	Lead	Nickel
Silver	Manganese	Zinc
		Cyanide

Reference(s) USDS 1996

Source 2 name: Settling ponds along Dolores River Source type Water & Sediment

Describe source: A series of settling ponds between St. Louis tunnel and outfall #2

Ground water migration containment: None

Surface water migration containment: ~~dirt~~ berms around ponds

Air migration (gas and migration) containment: None

Physical state of wastes: ☒ Liquid ☒ Solid ☐ Sludge/Slurry ☐ Gas ☐ Unknown
Constituent quantity of hazardous substances: _____ (specify units)
Wastestream quantity containing hazardous substances: _____ (specify units)
Volume of source (yd^3): _____ Area of Source (ft^2): 360,000

Hazardous substances associated with source 2:

Cadmium	Zinc	Mercury
Copper	Silver	
Silver	Antimony	

Reference(s) USDS 1996

SI Data Summary

Site Name Rico - Argentine

CONTINUATION PAGE FOR SOURCE CHARACTERIZATION

NA

Source #____ Name_____ Source type _____

Describe source: _____

Ground water migration containment: _____

Surface water migration containment: _____

Air migration (gas and migration) containment: _____

Physical state of wastes: ☐ Liquid ☐ Solid ☐ Sludge/Slurry ☐ Gas ☐ Unknown
Constituent quantity of hazardous substances: _____ (specify units)
Wastestream quantity containing hazardous substances: _____ (specify units)
Volume of source (yd^3): _____ Area of source (ft^2): _____

Hazardous substances associated with source #_____:

_____	_____	_____
_____	_____	_____
_____	_____	_____

Reference(s) _____

NA

Source #____ Name_____ Source type _____

Describe source: _____

Ground water migration containment: _____

Surface water migration containment: _____

Air migration (gas and migration) containment: _____

Physical state of wastes: ☐ Liquid ☐ Solid ☐ Sludge/Slurry ☐ Gas ☐ Unknown
Constituent quantity of hazardous substances: _____ (specify units)
Wastestream quantity containing hazardous substances: _____ (specify units)
Volume of source (yd^3): _____ Area of source (ft^2): _____

Hazardous substances associated with source #_____:

_____	_____	_____
_____	_____	_____
_____	_____	_____

Reference(s) _____

SI Data Summary

Site Name Rico-Argentine

5. **Description of removal or remedial activities**

If a removal has occurred, identify the removal authority and describe the activities. Specify the date(s) of the removal.

Various remedial activities have been conducted at the site. Activities have be largely conducted by Anaconda/ARCO.

Activities have included building a lime treatment plant for St. Louis tunnel outfall; Capping wells, back filling adits, installing fences and posting territory as off limits.

Reference(s) URS 1995

SI Data Summary

Site Name Rico - Argentine

GROUND WATER INFORMATION

1. **Ground water drinking water use within 4 miles of site sources:**
   ☐ Municipal ☒ Private ☐ Both ☐ No Drinking Water Use

   Reference(s) UOS 1996

2. **Is ground water contaminated?**
   ☐ Yes ☒ No ☐ Uncertain but likely ☐ Uncertain but not likely
   ☐ Additional sampling required
   Is analytical evidence available? ☒ Yes ☐ No Reference(s) UOS, 1996

3. **Is ground water contamination attributable to the site?**
   ☐ Yes ☐ No ☐ Additional sampling required ☒ Not Applicable Reference(s) UOS 1996

   NA

4. **Are drinking water wells contaminated?**
   ☐ Yes ☒ No ☐ Uncertain but likely ☐ Uncertain but not likely
   ☐ Additional sampling required
   Is analytical evidence available? ☒ Yes ☐ No Reference(s) UOS 1996

5. **Net precipitation** (HRS Section 3.1.2.2): 4.1 inches Reference(s) Univ of Delaware, 1986

6. **County average number of persons per residence:** 2.59 Reference(s) 1990 Census - U.S. Dept of Commerce

7. **Discuss general stratigraphy underlying the site.** Attach sketch of stratigraphic column.

   The uppermost layer of material is alluvial and landslide materials. The Hermosa formation (interlayered limestones and coarse sandstones) underly the unconsolidated materials. An intrusive body has deformed the Hermosa Fm.

   Reference(s) USGS 1974

8. **Using Table GW-1 (next page), summarize geology underlying the site** (starting with formation #1 as closest to ground surface). Indicate if formation is interconnected with overlying formation.

SI Data Summary

Site Name Rico-Argentine

TABLE GW-1: SITE GEOLOGY

NAME OF FORMATION	INTER-CONNECT? (yes/no)	TYPE OF MATERIAL	AVERAGE THICKNESS (FEET)	HYDRAULIC CONDUCTIVITY (CM/SEC)	USED FOR DRINKING WATER?
1. Alluvial/Landslide	?	Sand, Gravel	10-100 ft.	10^{-2} to 10^{-1}	yes
2. Hermosa Fm	?	Sandstones and limestones	500 ft.	10^{-4} to 10^{-5}	no
3.					
4.					
5.					
6.					

Reference(s) USGS 1974

9. **Does a karst aquifer underlie any site source?**
☐ Yes ☐ No possibly in Hermosa Fm Reference(s) USGS 1987

10. **Depth to top of aquifer:** 10 feet **Elevation:** 9000 Reference(s) USGS 1987

11. **In the table below, enter the number of people obtaining drinking water from wells located within 4 miles of the site.** For each aquifer, attach population calculation sheets. Key aquifer to formations listed in Table GW-1.

POPULATION SERVED BY WELLS WITHIN DISTANCE CATERGORIES BY AQUIFER

DISTANCE OF WELL(S) FROM SITE SOURCES	AQUIFER A: INCLUDES FORMATIONS 1	AQUIFER B: INCLUDES FORMATIONS	AQUIFER C: INCLUDES FORMATIONS
1/4 mile or less			
>1/4 to 1/2 mile			
>1/2 to 1 mile	2-6 summer residents		
>1 to 2 miles			
>2 to 3 miles			
>3 to 4 miles			

Reference(s) ~~HGS~~ URS 1995

12. **Is ground water from multiple wells blended prior to distribution?**
☐ Yes ☒ No Reference(s) URS 1995

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13. **Is ground water blended with surface water?**
☐ Yes ☒ No

Reference(s) URS 1995

Briefly describe: _____

14. **Distance from any incompletely contained source available to ground water to nearest drinking water well** (HRS Section 3.3.1): 1000 feet

Reference(s) URS 1995

15. **Briefly describe standby drinking water wells within 4 miles of sources at the site:**

None

Reference(s) URS 1995

16. **Using Table GW-2, summarize ground water analytical results for all sampling investigations.** *Include and identify background ground water sample results.*

17.* **Ground water resources within 4 miles of site sources** (HRS Section 3.3.3):
☐ Irrigation (5-acre minimum) of commercial food or commercial forage crops
☐ Commercial livestock watering
☐ Ingredient in commercial food preparation
☐ Supply for commercial aquaculture
☐ Supply for major or designated water recreation area, excluding drinking water use
☐ Water usable for drinking water but no drinking water wells are within 4 miles
☒ None of the above

Reference(s) URS 1995

18. **Wellhead protection area (WHPA) within 4 miles of site sources** (HRS Section 3.3.4):
☐ Source with non-zero containment factor value lies within or above WHPA
☐ Observed ground water contamination attributable to site source(s) lies within WHPA
☐ WHPA lies within 4 miles of site sources
☒ None

Reference(s) URS 1995

Additional ground water pathway description:

* There is only one groundwater well documented in the site area. This well is topographically higher that site sources, up gradient on the Dolores River.

References(s) URS 1995

TABLE GW-2: ANALYTICAL RESULTS FOR GROUND WATER PATHWAY

see table

SAMPLE ID & DATE	TYPE OF WELL	SCREENED INTERVAL	HAZARDOUS SUBSTANCE	CONCENTRATION (SPECIFY UNITS)	DETECTION LIMIT	REFERENCES
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					
	☐ Irrigation ☐ Monitoring ☐ Drinking water People served ______ ☐ Other ______					

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SURFACE WATER INFORMATION

Complete this section of the data summary for each watershed if there are multiple watersheds. Photocopy this page if necessary.

1. **Describe surface water migration path from site sources to at least 15 miles downstream.** Attach a sketch of the surface water migration route.

See Figure.
Surface water from Silver Creek enters the Dolores River. The Dolores river flows downstream through a mountainous canyon for 15 miles

Reference(s) URS 1995

2. **Is surface water contaminated?**
☒ Yes ☐ No ☐ Uncertain but likely ☐ Uncertain but not likely ☐ Additional sampling required
Is analytical evidence available? ☒ Yes ☐ No Reference(s) UOS 1996

3. **Is surface water contamination attributable to the site?**
☒ Yes ☐ No ☐ Additional sampling required Reference(s) UOS 1996

4. **Floodplain category in which site sources are located** (check all that apply):
☒ 1-year ☒ 10-year ☒ 100-year ☒ 500-year ☐ None Reference(s) URS 1995

5. **Describe flood containment for each source** (HRS Section 4.1.2.1.2.2):

Source #1 Tailings/Silver Creek Flood containment none

Source #2 Settling Ponds Flood containment berms

Source #3 _____ Flood containment _____

Source #__ _____ Flood containment _____

Source #__ _____ Flood containment _____

Source #__ _____ Flood containment _____

Source #__ _____ Flood containment _____

Reference(s) _____

6. **Shortest overland distance to surface water from any source** (HRS Section 4.1.2.1.2.1.3):
20 feet Reference(s) URS 1995

7. **Size of drainage area** (HRS Section 4.4.3): 4,500 Acres Reference(s) USGS 1960

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8.* **Describe predominant soil group within the drainage area** (HRS Section 4.1.2.1.2.1.2).

Sandy / Gravelly loams

Reference(s) URS 1995

9.* **2-year 24-hour rainfall** (HRS Section 4.1.2.1.2.1.2):
1.5 inches Reference(s) Divine & Leopold, 1978

10.* **Elevation of the bottom of nearest surface water body:**
8800 feet above sea level Reference(s) USGS 1960

11.* **Elevation of top of uppermost aquifer:**
9200 feet above sea level Reference(s) USGS 1960

12. **Predominant type of water body between probable point of entry to surface water and nearest drinking water intake:**
☒ River ☐ Lake Reference(s) USGS 1960

13. **Identify all drinking water intakes, fisheries, and sensitive environments within 15 miles downstream.**

TARGET NAME/TYPE	WATER BODY TYPE	DISTANCE FROM PPE	FLOW (CFS)	TARGET CHARACTERISTICS[1]	TARGET SAMPLED?
Trout Fishery	River	0.0	136		
Wetlands	River	½-1	136		

[1]If target is a drinking water intake, provide number of people served by intake.
If target is a fishery, provide species and annual production of human food chain organisms (pounds per year).
If target is a wetland, specify wetland frontage (in miles). Attach calculation pages.

Reference(s) URS 1995

14. **Is surface water drinking water blended prior to distribution?**
☐ Yes ☐ No Reference(s)

NA

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15. **Describe any standby drinking water intakes within 15 miles downstream.**

None identified

Reference(s) _____

16. **Surface water resources within 15 miles downstream** (HRS Section 4.1.2.3.3):

- ☐ Irrigation (5-acre minimum) of commercial food or commercial forage crops
- ☐ Commercial livestock watering
- ☐ Ingredient in commercial food preparation
- ☐ Major or designated water recreation area, excluding drinking water use
- ☐ Water designated by the state for drinking water use but is not currently used
- ☐ Water usable for drinking water but no drinking water intakes within 15 miles downstream
- ☒ None of the above

Reference(s) URS 1995

17. **Using Table SW-1, summarize surface water analytical results for all sampling investigations.** Include and identify background sample results.

TABLE SW-1: SUMMARY OF ANALYTICAL RESULTS FOR SURFACE WATER PATHWAY

see table

SAMPLE ID & DATE	SAMPLE TYPE	SAMPLE OBJECTIVE	TARGET NAME	HAZARDOUS SUBSTANCE	CONCENTRATION (SPECIFY UNITS)	DETECTION LIMIT	REFERENCES
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					
	☐ Aqueous ☐ Sediment ☐ Other	☐ Release ☐ Fishery ☐ Drinking water ☐ Sensitive environment Distance from PPE					

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SOIL INFORMATION

1. **Is surficial or soil contamination present at the site?**
   ☒ Yes ☐ No ☐ Uncertain but likely ☐ Uncertain but not likely
   ☐ Additional sampling required
   Is analytical evidence available? ☒ Yes ☐ No Reference(s) URS 1995

2. **Is surficial or soil contamination attributable to the site?**
   ☒ Yes ☐ No ☐ Additional sampling required

3. **Is surficial contamination on the property and within 200 feet of a residence, school, daycare center, or workplace?**
   ☒ Yes ☐ No ☐ Uncertain but likely ☐ Uncertain but not likely
   ☐ Additional sampling required
   Is analytical evidence available? ☒ Yes ☐ No Reference(s) URS 1995

4.* **Total area of surficial contamination** (HRS Section 5.2.1.2):
   _____ square feet Reference(s) _____

5.* **Attractiveness/accessibility of the areas of observed contamination** (HRS Section 5.2.1.1). Check all that apply:

   ☐ Designated recreational area
   ☐ Used regularly, or accessible and unique recreational area
   ☒ Moderately accessible with some use
   ☐ Slightly accessible with some use
   ☐ Accessible with no use
   ☐ Inaccessible with some use
   ☐ Inaccessible with no use

   Reference(s) URS 1995

6. **Using Table SE-1, summarize analytical results detecting surficial contamination within 200 feet of a residence, school, daycare center, or workplace.** Include and identify background sample results.

7. **Using Table SE-2, summarize analytical results detecting surficial contamination within the boundary of a resource or a terrestrial sensitive environment.** Include and identify background sample results if not listed in Table SE-1.

8. **Population within 1-mile travel distance from site.** Do not include populations from Table SE-1.

DISTANCE FROM SITE SOURCES	POPULATION
1/4 mile or less	100
>1/4 to 1/2 mile	150
>1/2 to 1 mile	192

Reference(s) Bob Small - Rico Mayor

TABLE SE-1: ANALYTICAL RESULTS FOR SOIL EXPOSURE PATHWAY

SAMPLE ID & DATE	SAMPLE DEPTH	TYPE OF PROPERTY	POPULATION	HAZARDOUS SUBSTANCE	CONCENTRATION (SPECIFY UNITS)	DETECTION LIMIT	REFERENCES
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					
		☐ Residence ☐ School ☐ Daycare center ☐ Workplace					

TABLE SE-2: ANALYTICAL RESULTS FOR SOIL EXPOSURE PATHWAY

SAMPLE ID & DATE	SAMPLE DEPTH	TYPE OF TARGET	HAZARDOUS SUBSTANCE	CONCENTRATION (SPECIFY UNITS)	DETECTION LIMIT	REFERENCES
		☐ Terrestrial sensitive environment ☐ Resources* ☐ Commercial agriculture ☐ Commercial silviculture ☐ Commercial livestock production or grazing				
		☐ Terrestrial sensitive environment ☐ Resources* ☐ Commercial agriculture ☐ Commercial silviculture ☐ Commercial livestock production or grazing				
		☐ Terrestrial sensitive environment ☐ Resources* ☐ Commercial agriculture ☐ Commercial silviculture ☐ Commercial livestock production or grazing				
		☐ Terrestrial sensitive environment ☐ Resources* ☐ Commercial agriculture ☐ Commercial silviculture ☐ Commercial livestock production or grazing				

AIR INFORMATION

1. **Is air contamination present at the site?**
   ☐ Yes ☐ No ☐ Uncertain but likely ☒ Uncertain but not likely
   ☐ Additional sampling required
   Is analytical evidence available? ☐ Yes ☒ No Reference(s) URS 1995

2. **Is air contamination attributable to the site?**
   ☐ Yes ☒ No ☐ Additional sampling required

3. **Are populations, sensitive environments, or wetlands exposed to airborne hazardous substances released from the site?**
   ☐ Yes ☐ No ☐ Uncertain but likely ☒ Uncertain but not likely
   ☐ Additional sampling required
   Is analytical evidence available? ☐ Yes ☒ No Reference(s) URS 1995

4. **Evidence of biogas release from any of the following source types at the site:**
   ☐ Below-ground containers or tanks ☐ Landfill ☐ Buried surface impoundment
   Reference(s) NA

5.* **Particulate migration potential factor value:** _____ (HRS Figure 6-2)

6.* **Particulate mobility factor value:** _____ (HRS Figure 6-3)

7. **Distance from any incompletely contained source to nearest residence or regularly occupied area:** 1/10 miles Reference(s) URS 1995

8. **Population within 4 miles of site sources.**

DISTANCE FROM SITE SOURCES	POPULATION
0 (within site sources)	0
1/4 mile or less	100
>1/4 to 1/2 mile	150
>1/2 to 1 mile	192
>1 to 2 miles	200
>2 to 3 miles	205
>3 to 4 miles	210

Reference(s) URS 1995

9.* **Resources within ½ mile of site sources** (HRS Section 6.3.3):
   ☐ Commercial agriculture
   ☐ Commercial silviculture
   ☒ Major or designated recreation area
   ☐ None of the above

Reference(s) URS 1995

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10. **Sensitive environments and wetlands within 4 miles of the site.**

NAME/DESCRIPTION/LOCATION OF SENSITIVE ENVIRONMENT OR WETLAND	DISTANCE FROM SITE (MILES)	TYPE OF SENSITIVE ENVIRONMENT	WETLAND SIZE (ACRES)
Wetlands along			
Dolores River below	.5 to 1.0		15.0
(downstream) of Silver Creek			
and the town of Rico			

Reference(s) URS 1995

11. **Using Table Air-1, summarize air analytical results for all sampling investigations.** Include and identify background sample results.

NO Air samples

TABLE AIR-1: SUMMARY OF ANALYTICAL RESULTS FOR AIR PATHWAY

SAMPLE ID & DATE	SAMPLE TYPE	DISTANCE FROM SITE (MILES)	TARGET(S) WITHIN DISTANCE CATEGORY	HAZARDOUS SUBSTANCE	CONCENTRATION (SPECIFY UNITS)	DETECTION LIMIT	REFERENCES
			☐ Number of people ________ ☐ Name of sens. environment ________ ________ ☐ Wetland acreage ________				
			☐ Number of people ________ ☐ Name of sens. environment ________ ________ ☐ Wetland acreage ________				
			☐ Number of people ________ ☐ Name of sens. environment ________ ________ ☐ Wetland acreage ________				
			☐ Number of people ________ ☐ Name of sens. environment ________ ________ ☐ Wetland acreage ________				
			☐ Number of people ________ ☐ Name of sens. environment ________ ________ ☐ Wetland acreage ________				
			☐ Number of people ________ ☐ Name of sens. environment ________ ________ ☐ Wetland acreage ________				
			☐ Number of people ________ ☐ Name of sens. environment ________ ________ ☐ Wetland acreage ________				

Site Name _____

ADDITIONAL INFORMATION AND COMMENTS

Reference(s) _____

APPENDIX D

VALIDATION REPORTS AND LABORATORY DATA

(under separate cover)